

SEGA[®]

SP-400

4 COLOR PLOTTER PRINTER

: for SC-3000 personal computer

Operation Manual

Introduction

Congratulations for selecting this high-quality, low-cost color plotter printer! We know this Printer is the ideal output device for home or business use.

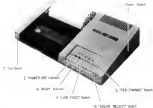
Its special features include:

- A set of simple instructions that allow you to change colors, backspace the pens, reverse feed the paper, and more!
- Four color pens (black, blue, green, and red)
- Standard roll paper (144" wide by 10meters long)
- 60 character per line plotting

Contents

1 General Description	3
2 Setting Up	8
3 Background Information	8
4 Using the plotter/printer	10
Control Codes	11
Graphic Commands	13
5 Specifications	22
Appendix A / Sample Programs	24
Appendix B / Graphix Commands Summary	27
Appendix C / ASCII Character Set	28
Appendix D / Programming Notice	29

1 General Description



- 1 Power Switch
- 2 P&N CHANGE Switch
- 3 COLOR SELECT Switch
- 4 LINE FEED Switch
- 5 POWER ON Indicator
- 6 BUSY Indicator
- 7 Top Cover

Controls primary DC power to the printer.
On pen installation and removal of pen push key. Then pen holder moves to the right and ready for installation or removal.
Pen holder returns to the rest position and next color pen is active.
The pen advances while this switch is being depressed.
The self-test function is set programmed and can be performed by turning the power switch on while depressing this switch.
Illuminates while the AC power is on.
Illuminates while the printer is busy.
On paper loading or pen change operation open the cover.

2 Setting Up



Power Cable Connections



Connect the AC output plug from the AC adaptor to the DL inlet socket.

Connecting the Plotter/Printer to SC-3000 computer



1 Connect DB-9 pin plug to the EP-400 printer interface.



2 Connect DB-25 pin plug to the printer port of SC-3000 computer.



3 **WARNING:**
Format cable connections after both equipment have power off.

Paper Loading

When loading paper into the platen, printer follow these steps:

1. With screens out, the end of the paper square
2. Insert the end of the paper into the slot at the bottom of the Platen
3. Insert the shaft into the roll and place the roll of paper in the paper compartment
4. Turn the power on
5. Raise the top cover so printing will not be done on the platen
6. Press the LINE FEED button to feed the paper in through the slot and around the platen.

Pen Installation

Be very careful when touching the Pen Holder. The Holder is delicate and can be easily damaged. Never rotate or move the Pen Holder manually. Use the printer controls to move the Pen Holder.



Pen Holder Mechanism

Pen Installation/Removal

Important Note: You must always use *lost pens*. Using the Printer with only three (or fewer) pens may cause incorrect color changes when you are changing color.

You can install the Pens in any order you want. However, the Printer recognizes four specific pen positions: Pen #1, Pen #2, Pen #3 and Pen #4. We suggest you use the sequence in the Table below when installing pens. When referring to Pen Colors and Pen Positions in this manual, we'll be using this sequence:

Pen Position and Pen Color	
Pen #	Color
1	Black
2	Blue
3	Green
4	Red

Table

There are two ways to identify a particular Pen Position.

- The Pen Guide Wheel is color-coded. Look carefully near the center of the Wheel and match the color of the Pen with the color on the Wheel.
- Turn the Printer OFF, then back ON. On power-up, Pen # 1 (color-coded Black) is always up. To get to Pen # 2, press **COLOR SELECT**; to get to Pen # 3, press **COLOR SELECT** again.

We recommend that if you know that you wish be using the Printer for a while (e.g., more than a day or two) that you remove the Pens from the Printer and "cap" them so the ink won't dry out. Rub the Pen Peak back and forth on a piece of paper to get the ink flowing before you install it in the Printer.

Before you install, remove, or replace any Pen, take a look at, and become familiar with, what's under the cover.

Remove the top cover and look in the right side printing area. You'll see a wire about 1/4" long pointing to the left. Above it and to the right there will be a small white lever: the Pen Ejection Lever. Gently press down on this lever and the wire will go up. When a Pen is in the Holder, this will "pop" the Pen out.

Note: Do not move or rotate the Pen Holder manually.

To install, remove, or change Pens:

1. Remove the Top Cover.
2. Press the COLOR SELECT Switch to rotate to the Pen Position # you need.
3. Press the PEN CHANGE Switch.
The Pen Holder will move to the far right. Note that the Pen Ejection Lever wire will be under the Pen.

4. If you're removing or changing a Pen:
 - Gently hold the Pen down with one finger.
 - Gently press down on the Pen Ejection Lever.If the Pen "pops" into the Printer, hold the Paper Roll (if installed) near the Printer upside down, and gently shake the Printer until the Pen falls out. Do not operate the Printer with a Pen loose in the printing mechanism. Damage to the Printer may result.
 - Remove the pen.To install a new Pen, insert the "ink" tip of Pen into the Pen Wheel Guide hole (blanch the color on the pen with the color on the Wheel.) Gently "snap" the other end of the Pen into place.
5. To rotate the Pen Holder to the next Pen Position (P2) press the COLOR SELECT Switch.
The Pen Holder will again to the left, return to Pen Position # 2, and return to the right most position.
To select Pen Position # 3, repeat the above procedure.
6. Close the Top Cover.
7. Press the LINE FEED Switch and the Pen Holder will return to the left margin and will be ready to begin printing.

3 Background Information

The BASIC command to send information to the printer is LPRINT

```
LPRINT "V" 
```

Before printing, the Printer checks to see if the character sent is an instruction (on how to print) instead of data (to be printed). An instruction, for example, might tell the Printer to backspace or change to a different Pen.

Consequently, some ASCII codes were created as instructions to control printers and therefore are called "Control Codes".

How do we send instructions to the Printer?

To send instructions to the Printer, use "control codes". To do this, use the BASIC function CHR\$(). For example, to tell the Printer to backspace (ASCII Code 8), use the command:

```
LPRINT CHR$(8) 
```

In a program (or in the "direct mode") and the Printer will backspace.

Any ASCII code (control codes as well as data) can be sent to the Printer this way. Appendix C lists the ASCII codes the Printer recognizes. For instance, Appendix C will tell you that the ASCII code for the letter A is 65 (decimal). If you use the command:

```
LPRINT CHR$(65) 
```

Printer will print the letter A.

Text and Graphic Modes

The Printer has two modes of operation:

- Text Mode for word processing, note writing, program listings and program output.
- Graphic Mode for assembling graphic pictures and other visual creations.

Text Mode: On initial power-up, the printer will be in Text Mode. When in Graphic Mode, to return to Text Mode type

```
LPRENT CHR$(17) 
```

Graphic Mode: In this mode, you can generate graphs, pictures and other visual creations. To put the Printer in Graphic Mode, send a Control Code (8 decimal) to the Printer using LPRINT. For instance:

```
LPRENT CHR$(8) 
```

In Graphic Mode, you can move the Pen to any point on the paper and draw a line to any other point.

Think of the Pen as being on a Cartesian coordinate plane, with the X axis running left and right (horizontal) and the Y axis going up and down (vertical).

Positive is up and to the right, negative is to the left and down the paper. See Figure below.

The origin may be set anywhere on the paper. When first entering the Graphic Mode, the origin is at the left margin and under the Pen.



Coordinate (X,Y) Axis

Ultimately, speaking, you can tell the Pen to do two things:

- **MUOVE** with the Pen up
- **DRAW** with the Pen down

The Pen can move (or draw) two different ways:

- **RELATIVE** Movement from the current Pen position to a point relative to the pen location
- **ABSOLUTE** Movement from the current Pen position to a point relative to the Origin

There are times when a specific method will be more convenient to use

How does the Pen move?

In both horizontal and vertical directions, Pen movement is measured in steps. Each step is 0.1 mm long (about the size of a period) and there are 250 steps across the paper

4 Using the Plotter / Printer

Automatic Start-up Sequence

Once the Printer is properly connected, it will execute a short built-in routine that tests the Pen Holder and draws four small boxes in each available pen color on power up.

This allows you to be sure that each Pen has enough ink and is drawing correctly before you begin using the Printer.



Automatic Start-Up Sequence

After the four boxes are drawn, the Pen will return to the left margin. The printer will then be in Test Mode and ready for operation.

Manual Operation

You can change pen color with the COLOR SELECT key and advance the paper using the LINE FEED key.

Program Control

The printer can be controlled entirely from within a BASIC program. Note that you can use Control Codes K100H-14 to send instructions to the Printer as well as data to be printed. In this section, we'll describe the Control Codes in sequence starting from CH98 (88) through L10H (66). Then, we'll describe the Graphic Commands listed alphabetically.

With each code or command, we've included a short example. The examples serve two purposes. First, they show how to use the command being discussed. Second, they show how to use combinations of commands to draw with the Printer. Once you are here

simple it is to program the Printer, you can write your own graphic programs. (For more involved programs, see Appendix A.)

Control Codes

CHR\$ (8)

Backspace (Text Mode)

This command backspaces the Pte one character at a time. CHR\$ (8) is very useful when you need to undo a key.

Example

```
10 LPRINT "A"  
20 LPRINT CHR$(8);  
30 LPRINT CHR$(8);
```

This program will print the letter A, then backspace four 8s and print an underline.

CHR\$ (11)

Reverse Line Feed (Text Mode)

CHR\$ (11) moves the paper back exactly (reverses) one line at a time. This is often used for superscripts.

Example

```
10 REM SUPERSCRIPT DEMONSTRATION  
20 LPRINT "2"  
30 LPRINT CHR$(11);  
40 LPRINT "2"  
50 LPRINT CHR$(10); REM LINEFEED  
60 END
```

CHR\$ (18)

Select Graphic Mode

When the Printer is in Text Mode, this command will put it into Graphic Mode.

Example:

```
10 LPRINT CHR$(10)
```

CHR\$(17)

Select Text Mode

This command is used when text material is to be printed. There are other commands that allow you to print words in Graphic Mode, but LPRINT (17) is the easiest way to change to Text Mode and print text, however graphic material.

Example:

```
20 LPRINT CHR$(17)
```

CHR\$(29)

Rotate Pen Holder (Text Mode)

This command advances the Pen Holder one color. CHR\$(29) is used to change color from Text Mode and you must keep track of what color is next. If you want a color beyond the first Position you may use the command more than once.

Example:

```
30 LPRINT CHR$(29)
```

Graphic Commands

The following commands can be used in Graphic Mode only:

A

Return to Text Mode (Reset)

A

This command moves the Pen Holder to the left margin (without changing a line and without vertical movement) and returns the Printer to text Mode. In this case the Origin is also re-defined (reset) as the left margin.

Example:

```
10 LPRINT CHR$(10)
20 LPRINT "A"
30 LPRINT "B"
```

This example will put the Printer into Graphic Mode (line 10). Line 20 will return the Printer to Text Mode. Line 30 will print the letter A.

C

Change Color

C color

color = a numeric expression from 0 to 3. color is optional; if omitted 0 is used.

If you installed the Plot according to the suggested sequence, color then 0 = Black 1 = Red 2 = Green and 3 = Blue.

If not: Ask the Pen you installed as Pen Position # 1 will determine the color when you send the Color command to the printer.

Example:

```
10 LPRINT "C1"
```

Example: See APPENDIX D

D

Draw (Absolute)

D destination

destination specifies the endpoint of the point you wish and is a X,Y coordinate. (The startpoint of the line is the current Pen position) *destination* may be repeated to draw more than one line.

D draws a line from the current pen position to a destination point. The destination point is e.g. the point where the line ends; it is the form x,y where X and Y are a coordinate pair with respect to the Origin.

If more than one pair of coordinates are specified then the line will be continued to the second point then to the third point etc. X and Y are values between 000 and 999.

Example

```
10 REM DRAWING EXAMPLE
20 LPRINT CHR$(18) : REM TURN ON GRAPHICS
30 LPRINT "00,100,100,100,100,0,0,0"
40 LPRINT "A"
50 END
```

The example will draw a box. Remember that the paper is 100 rows across and as deep as you wish (up to 999 rows). Since you didn't specify a different Origin, the Pen started at 0,0. The corners of the box are at 0,0 100,100,100,100 and 000,0.

H

Return to Origin (Home)

H

The H command will move the Pen to the Origin without drawing a line.

Example

```
10 LPRINT "H"
```

I

Set Origin (Initialize)

I

This command resets the Origin to the current location of the Pen point

Example

```
10 REM RELATIVE ORIGIN
20 LPRINT CHR$(10)
30 LPRINT "0000.0"
40 LPRINT "1"
50 END
```

This short routine draws a line to the center of the paper then defines the center of the paper as the Origin.

J

Draw (Relative)

J *destination* —
destination specifies the endpoint of the point you wish to draw to and is a X,Y coordinate. (The startpoint of the line is the current Pen position.) *destination* may be repeated to draw more than one line.

The J command draws a line from the current Pen position to an end point. The end point is determined by moving up X units and right Y units, for left and down if X and Y are negative.

Once the Pen is at this new position, the line can be continued to another point by supplying another pair of X,Y values. The new point is measured from the previous point, and not from the original pen position. X and Y must be in the range -320 to 320.

Example

```
10 REM RELATIVE DRAWING
20 LPRINT CHR$(10)
30 LPRINT "10,100,100,0,0,0,100,100,0"
40 END
```

This draws the same box as the sample for the D command, but specifies the corners differently. Read line 30 like this:

"From where you are, draw a line to the point that is 0 steps to the right (in the X direction) and 100 steps up (in the Y direction). Then, from that point, draw a line that is 100 steps to the right and 0 steps up, then a line from that is 0 steps to the right and 100 steps down. Finally draw a line that is 100 steps to the left and 0 steps up."

M

Move (Absolute)

Max

- x* specifies a position on the X-axis and is a numeric expression between 000 and 999
- y* specifies a position on the Y-axis and is a numeric expression between 000 and 999

The M command moves the Pen from its present location to the point specified by *x* *y* without drawing a line. *x* and *y* must be in the range 000 to 999.

Example

```
100 LPRINT "MOVER, +100"
```

L

Line Type

L Type

- type* specifies the "Type" of line you wish to draw and is a numeric expression from 0 to 15. *type* is optional. If omitted, 0 is used. 0 is a solid line.
- 1 through 15 generate different types of dash lines; the greater the number, the further apart the dashes are.

The L command lets you specify different line types. You can specify a solid line or 15 different types of dashed (or dotted) lines. The following table illustrates the line types available.

Line Types	
Line Specified	Line Display
0	
1	
2	
3	
4	



Example

```

10 RUN LINE SAMPLE PROGRAM
20 LPRINT CHR(15)
30 LPRINT "L"
40 LPRINT "JUNK"
50 LPRINT "R"
60 END

```

Line 20 sets the line type to 1. The program will draw a dotted line across the page. Add an instruction to change the color, if you wish.

P Print Text Characters

P characters

characters is either a alpha-character (A-Z) or a numeric character

The P command lets you print either alpha- or numeric characters while in Graphs Mode without first switching to Text Mode. Characters may any string of letters or numbers.

After the command is executed, the Printer will still be in Graphs Mode.

Example:

18 LPRINT "GRAPHIC PRINTER"

Will print the string GRAPHIC PRINTER while the Graphic Printer is in Graphic Mode.

S Character Size

S size

size specifies the size of the printed characters, and *n*, a numeric expression between 0-63, *size* is optional; if omitted 0 is used.

The S command lets you specify the size of the character drawn with the P command. *size* may be a numeric expression between 0-63; 0 draws the smallest characters size (80 characters per line); 63 the largest (11 characters per line).

Use this formula to determine the size of printed character in relation to the numeric value you specify:

$$cpl = 80/size + 11$$

where cpl is the number of characters per line and size is the numeric value you specify with the S command.

Remarks: See APPENDIX D.

Q Rotate Print Direction

Q direction

direction specifies which direction you wish printing to be and *n* is a numeric expression from 0 to 3; *direction* is optional; if omitted 0 is used.

On power up (in Text Mode) Q0 is used.

However, when you enter Graphic Mode, you can specify one of four directions for character printing. See Table below.

Printing Direction	
Direction specified	Print Direction
0	Left to Right
1	Top to Bottom
2	Right to Left (upside down)
3	Bottom to Top

For instance, using the word JOY as an example:

- L0 (left to right) would produce JOY
- L1 (top to bottom) would print
J
O
Y
- L2 (right to left) would produce YOJ
- L3 (bottom to top) would print
Y
O
J

Example

```

10 REM WRITING SIDWAYS
20 LPRINT CHR$(10)
30 LPRINT "HELLO" : REM ALLOW LEFT MARGIN
35 INPUT TYPE YOUR NAME : IN$
40 LPRINT "P" IN$ : REM WRITE YOUR NAME
50 LPRINT "Q1" : REM CHANGE DIRECTION
60 LPRINT "P" IN$ : REM WRITE YOUR NAME
70 LPRINT "Q2" : REM NOW UPSIDE DOWN
80 LPRINT "P" IN$ : REM WRITE YOUR NAME
90 LPRINT "Q3" : REM CHANGE DIRECTION
100 LPRINT "P" IN$ : REM WRITE YOUR NAME
110 LPRINT "Q0" : REM BACK TO RIGHTSIDE UP
120 LPRINT "Q" : REM BACK TO TEXT MODE
130 END

```

R Move (Relative)

R *axis*

- specifies a point on the Y axis and is a numeric expression between -999 and 999
- specifies a point on the X axis and is a numeric expression between -999 and 999

This command moves the from the current location to the point that is *x* steps away to the right (or left if it is negative) and *y* steps up (down if *y* is negative)

Example

```
10 REM SAMPLE OF RELATIVE MOVE
20 LPRINT "GRAPHIC" : REM TURN ON GRAPHICS MODE
30 LPRINT "R128-0" : REM MOVE TO RIGHT 128 STEPS
40 LPRINT "R0,-128" : REM NOW MOVE 128 STEPS DOWN
50 LPRINT "P-128,128" : REM NOW DRAW A LINE BACK TO THE
  BEGINNING
60 LPRINT "A" : REM AND QUIT
70 END
```

- 1 Line 10 moves the point 128 steps to the right and 0 steps up
- 2 Line 30 moves the point 128 steps down and 0 steps to the right
- 3 Line 40 draws relative back to the origin undoing the moves of lines 30 and 40

X Draw X-Y Axis

X *axis, step, interval*

- *axis* specifies axis to be drawn and is a numeric expression of order 1 (X axis) or 2 (Y axis)
- *step* specifies the graduation distance between measurement marks on the axis and is a numeric expression between -999 and 999
- *interval* specifies the number of times that step is to be repeated and is a numeric expression between 1 and 255

The `h` command lets you draw Coordinates (X,Y) Axes. Divide the axis into specified units of measurements (horizontal) and designate how many units of measurements are to be drawn on the axis.

If `axis = 1` a vertical (Y) axis will be drawn. If `axis = 1` a horizontal (X) axis will be drawn.

The axis can also be divided into segments. Since each step is 0.1 mm the exact distance between segment results can be easily set. You may have 1 to 250 intervals, each one 1 to 800 steps long. If interval is negative the axis will be drawn from the left or down depending on the choice for axis.

Example

```
10 LPRINT "20-0, 20"
```

will draw a vertical axis up from the present location. There will be a small dash (tick) every 1 steps (0.1 inches altogether)

```
10 LPRINT "11-140-16"
```

This command will produce a horizontal axis left of the current Pen location with 16 sections each 10 steps apart.

Remarks: See APPENDIX D

5 Specifications

1. Plotting/Plotting System	Ball Point Pen 4 color
2. Plotting Speed(Horizontal) (Vertical)	150mm/sec (2.80 ipm) 110mm/sec (4.28 ipm)
3. Plotting Speed	12 characters per second (cps)
4. Resolution	0.2mm step (0.00787 inch)
5. Effective Plotting Range	45mm(1.801 inch) X-axis Divided into 400 steps (No limit to Y direction)
6. Characters per Line	36 (TICK1 mode) (Determined by software in Graphic mode)
7. Accuracy (Repeatability) (Minimized) (Deviation)	0.2mm max 0.2mm max 0.5% max (X axis) 1.0% max (Y axis)
8. Selectable Modes Self Test Test Mode Graphic Mode	Print 96 ASCII character set Serial Plotting Image Plotting using the various commands
9. Interface	For SC-8000 only CTTL level serial interface
10. Pen Life	250m (825 feet)
11. Temperature Range(world) (ambient)	40° to 150° (45 to 60 °F) -40 to 71°C (-40 to 160°F)
12. Humidity Range	40% to 80% relative noncondensing
13. Power Supply	AC adapter output DC 9V / 1.2A (max. 1)
14. Dimensions	170(W) × 174(D) × 60(H) mm
15. Weight	360g

② DEMO: PLOTTING ABILITY

```

10 GET FILE 1
20 PLOT=0: P2
30 KLT=999: PLOTTING=NO: LIT=NO
40 LPRINT LPRINT: PLOTTING
50 LPRINT LPRINT: PLOTTING ABILITY
60 LPRINT: LPRINT: LIT
70 PLOT: PLOTTING: NO: LPRINT
80 LIT: 0: 10: (NO: LIT: 10
90 LIT: LPRINT
100 PLOTTING: PLOTTING
110 PLOTTING: LIT
120 PLOTTING: LIT: PLOTTING
130 LPRINT: LIT: LIT: LIT: LIT: LIT
140 PLOT
150 LPRINT: PLOTTING
160 LPRINT: LIT
170 PLOTTING: LIT
180 PLOTTING: LIT: LIT
190 LIT: LIT: LIT: LIT: LIT: LIT
200 PLOTTING: LIT: LIT: LIT: LIT: LIT: LIT
210 LIT: LIT: LIT: LIT: LIT: LIT
220 PLOTTING: LIT: LIT: LIT: LIT: LIT: LIT
230 LIT: LIT: LIT: LIT: LIT: LIT
240 PLOTTING: LIT: LIT: LIT: LIT: LIT: LIT
250 LIT: LIT: LIT: LIT: LIT: LIT
260 LIT: LIT: LIT: LIT: LIT: LIT
270 LIT: LIT: LIT: LIT: LIT: LIT
280 LIT: LIT: LIT: LIT: LIT: LIT
290 LIT: LIT: LIT: LIT: LIT: LIT
300 LIT: LIT: LIT: LIT: LIT: LIT
310 LIT: LIT: LIT: LIT: LIT: LIT
320 LIT: LIT: LIT: LIT: LIT: LIT
330 LIT: LIT: LIT: LIT: LIT: LIT
340 LIT: LIT: LIT: LIT: LIT: LIT
350 LIT: LIT: LIT: LIT: LIT: LIT
360 LIT: LIT: LIT: LIT: LIT: LIT
370 LIT: LIT: LIT: LIT: LIT: LIT
380 LIT: LIT: LIT: LIT: LIT: LIT
390 LIT: LIT: LIT: LIT: LIT: LIT
400 LIT: LIT: LIT: LIT: LIT: LIT
410 LIT: LIT: LIT: LIT: LIT: LIT
420 LIT: LIT: LIT: LIT: LIT: LIT
430 LIT: LIT: LIT: LIT: LIT: LIT
440 LIT: LIT: LIT: LIT: LIT: LIT
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460 LIT: LIT: LIT: LIT: LIT: LIT
470 LIT: LIT: LIT: LIT: LIT: LIT
480 LIT: LIT: LIT: LIT: LIT: LIT
490 LIT: LIT: LIT: LIT: LIT: LIT
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690 LIT: LIT: LIT: LIT: LIT: LIT
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760 LIT: LIT: LIT: LIT: LIT: LIT
770 LIT: LIT: LIT: LIT: LIT: LIT
780 LIT: LIT: LIT: LIT: LIT: LIT
790 LIT: LIT: LIT: LIT: LIT: LIT
800 LIT: LIT: LIT: LIT: LIT: LIT
810 LIT: LIT: LIT: LIT: LIT: LIT
820 LIT: LIT: LIT: LIT: LIT: LIT
830 LIT: LIT: LIT: LIT: LIT: LIT
840 LIT: LIT: LIT: LIT: LIT: LIT
850 LIT: LIT: LIT: LIT: LIT: LIT
860 LIT: LIT: LIT: LIT: LIT: LIT
870 LIT: LIT: LIT: LIT: LIT: LIT
880 LIT: LIT: LIT: LIT: LIT: LIT
890 LIT: LIT: LIT: LIT: LIT: LIT
900 LIT: LIT: LIT: LIT: LIT: LIT
910 LIT: LIT: LIT: LIT: LIT: LIT
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940 LIT: LIT: LIT: LIT: LIT: LIT
950 LIT: LIT: LIT: LIT: LIT: LIT
960 LIT: LIT: LIT: LIT: LIT: LIT
970 LIT: LIT: LIT: LIT: LIT: LIT
980 LIT: LIT: LIT: LIT: LIT: LIT
990 LIT: LIT: LIT: LIT: LIT: LIT
1000 LIT: LIT: LIT: LIT: LIT: LIT

```

PLOTTING ABILITY



② DEMO4 FILMENT

```

100 REM *** DEMO 4 FILMENT ***
101 LPRINT CHR$(13)
200 REM
400 REM *** 100-200 100-100 ***
500 FOR I=1 TO 5
600 REM I
700 REM-100-100-100 100-100-100-100
800 REM I=1 TO 1000
900 LPRINT I " +STR$(I)
1000 FOR JJ=0 TO 1000000 JJ
110 REM I=100
120 LPRINT I " +STR$(I) " , -STR$(I)
130 GOTO 100
140 NEXT I
150 REM
160 LPRINT I "
170 REM
180 REM
190 IF I=1 THEN 200
200 I=I+1
210 GOTO 100
220 GOTO 100
230 GOTO 100
240 GOTO 100
250 REM
260 I=I+1
270 REM
280 REM
290 IF I=1 THEN 300
300 GOTO 100
310 GOTO 100
320 GOTO 100
330 GOTO 100
340 REM
350 REM
360 LPRINT I " +STR$(I) " , -STR$(I)
370 REM

```



Appendix B

Graphic Commands Summary

COMMAND	PARAMETERS	EFFECTS
LINE TYPE	LT(<i>p</i>)-0 to 10	Change line type. From 0 to 11: 0-4 solid line 5-10 dashed/dotted/dash-dot
ALL INITIALIZE	A	Reset Pen across the left margin without drawing and return to first block
HOME	H	Move Pen to center of page without drawing line
INITIALIZE	I	Reset new Origin (i.e. the current Pen home pos.)
DRAW	Da <i>p</i> , <i>x</i> , <i>y</i> 1-999 <i>x</i> 1, <i>y</i> 1000	Draw from current coordinate to specified destination if there is more than one point for line coordinate to the second point etc. Current Origin is used
RELATIVE DRAW	RDa <i>x</i> 1, <i>y</i> 1 <i>x</i> 2, <i>y</i> 2 1-999 <i>x</i> 1, <i>y</i> 1000	Draws a line from current Pen location 2 steps to the right and 1 steps up
MOVE	Md <i>x</i> 1-999 <i>x</i> 1, <i>y</i> 1000	Move/translated Move without drawing to location <i>x</i> steps left and <i>y</i> steps up/down from the present origin
RELATIVE MOVE	MDa <i>x</i> 1, <i>y</i> 1 1-999 <i>x</i> 1, <i>y</i> 1000	Move/translated Move without drawing from present location to location <i>x</i> steps to the right left and <i>y</i> steps up/down
COLOR CHANGE	Cn (<i>p</i> =0 to 9)	Change color on TEXT mode
SCALE SET	Ss (<i>x</i> =0 to 25)	Specifies the size of the character
ALPHA ROTATE	Ga (<i>a</i> =0 to 3)	Change print direction <i>a</i> =0 left to right/normal <i>a</i> =1 top to bottom <i>a</i> =2 upside down <i>a</i> =3 bottom to top
PRINT	PL(<i>p</i> , <i>x</i>)-10, 25-100	Print character in Graphic Mode
AXIS	Xax <i>x</i> 1, <i>y</i> 1-0 to 0 <i>x</i> 2, <i>y</i> 2-100 to 100 0-100 250	Draw a coordinate axis from present location to direction <i>p</i> =0 Text <i>p</i> =1 Scale <i>x</i> =measurement marks on axis 1" interval

Appendix C

ASCII Character Set

The following table lists each character the Printer will print and the ASCII code that will print it.

	0	1	2	3	4	5	6	7
0				@	@	P	'	P
1		BC1	9	I	A	Q	a	q
2		BC2	"	2	B	R	b	r
3			#	3	C	S	c	s
4			\$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8	BS		(	8	H	X	h	x
9			)	9	I	Y	i	y
A	LF		*	:	J	Z	j	z
B	VT LD		+	;	K	[	k	{
C			,	<	L	\	l	|
D	CR	WD	-	=	M	]	m	}
E			.	>	N	^	n	~
F			/	?	O	_	o	8

NOTES

BS

LF

LD

CR

BC1

BC2

NC

Back Space

Line Feed

Line Up

Carriage return

Device Control 1 (First Model)

Device Control 2 (Kingstar Model)

Next Color

Appendix D

Programming Notice

Abstract. The authors present a new method for the analysis of the stability of the equilibrium of a system of particles. The method is based on the use of the concept of the "effective potential" and the "effective mass" of the system. The method is applied to the analysis of the stability of the equilibrium of a system of particles in a magnetic field. The results show that the method is very effective and can be used to analyze the stability of the equilibrium of a system of particles in a magnetic field.

- i) When printer is holding BUSY condition more than 4 second, error occurs ESC/PR indicates 'Device Not Ready Error' on CRT screen and stops processing continuation.)

To avoid the occurrence of errors, an additional program to check the composer is run **WAIT** as necessary after using the process as follows:

THE NEW YORK PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATION
500 5TH AVENUE
NEW YORK 10018

A. Economic policy index TEST results: (1) χ^2 -test

Figure 1

H. First large scale character	(weighting: none is decided by character model)
--------------------------------	---

E. Execute AIOB command
Waiting time is decided by
parameter of AIOB command

D. Evaluate other projects that a higher level more than a regional jurisdiction (D, L, M and R command works)

1. Under LPRINT, LIST and PRINT control, specify whether as follows:

A Graphs character or Individual character changes to "space character automatically".

B On windows you'll always have a little bit of space around

15. Truncated nonlinear least-squares data block in standard mode

Because bc390 BASIC inserts automatically CR code (CHR\$(13)) into the line string after 38 characters.

References

Age Group	18-24	25-34	35-44	45-54	55-64	65-74	75+
Male	10.2	11.5	12.8	14.1	15.4	16.7	18.0
Female	9.8	11.0	12.3	13.6	14.9	16.2	17.5

178 179 180 181 182

Good LEAD-INT. Table 110 100 100 100 100 100

LEAST	1980	1981	1982	1983	1984	1985
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1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26